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STUDIES IN CANCER AND ALLIED SUBJECTS.

Studies in Cancer and Allied Subjects. Vol. i., *The Study of Experimental Cancer: a Review.* By Dr. W. H. Woglom. Pp. xi+288. Vol. ii., *Pathology.* Pp. vi+267. Vol. iii., *From the Departments of Zoology, Surgery, Clinical Pathology, and Biological Chemistry.* Pp. ix+308. Conducted under the George Crocker Special Research Fund at Columbia University. (New York: Columbia University Press. 1913.) Price 5 dollars net each volume.

BOTH the late Mr. George Crocker and his wife are reported to have died of cancer, and it may be recalled that an action was brought against Mr. Crocker for the recovery of a larger fee than had originally been agreed on for the surgical treatment of his wife. Thus, perhaps, it came about that Mr. Crocker left property to Columbia University which on partial realisation yielded somewhere about 300,000*l.* When he made his first donation for the investigation of cancer it was decided by those who had the matter in hand that, until a form of organisation was decided on, the money could best be expended by making grants to special workers in the departments of anatomy, zoology, surgery, pathology, and biological chemistry of Columbia University and the College of Physicians and Surgeons, New York.

Leaving vol. i., which is a monograph of xi+288 pp., by Dr. W. H. Woglom, for special reference later, the outcome has been the publication of sixty-six papers, which are collected in vols. ii. and iii. Of these papers twelve have not been published before, two are reprinted with expansion, and the rest are merely reprinted. Useful introductions are supplied to the papers by the professors in several departments (notably for zoology by Calkins, pathology by MacCallum, and bio-chemistry by Gies). In these introductions are set forth the points of view from which work has been directed. It is impossible to review the separate papers which have interest mainly for those actually engaged in similar work, who will be glad to have the papers in collected form.

Calkins and his fellow-workers have thrown their main strength in the direction of studying the phenomena of growth. He claims nothing could be more clearly demonstrated than the need for "team work," or the joint activity of pathologist, chemist, surgeon, clinician, biologist, from the results of two years' work. The underlying biological principle activating the researches on growth, and binding them into a consistent whole, was for Calkins "the physiological balance with self-regulation perfect in normal conditions thrown out of adjustment in cancer." Experiments were done on the effect of mutilating unicellular organisms. The thyroid and thymus glands were removed from rats, in order to study any possible consequences on the growth of tumours. The effects of chemical and mechanical irritation on mammalian tissues were studied, and extracts of glands injected with a view of observing any stimulating or inhibitive effects on the growth of transplanted tumours. Except the work on Paramœcium and Uronychia by Calkins himself, the experiments appear to have been conducted on too small a scale, and therefore it is not surprising they are for the most part stated to be negative or inconclusive and requiring expansion. They were admittedly conducted with a view to finding a point of attack, and it would be unfair to offer any criticism.

MacCallum's introduction is an interesting and very instructive review of present knowledge from the point of view that it is, perhaps, the poverty of our knowledge as to the factors which influence the energy of growth, and, indeed, growth in general, which is responsible for our inability to arrive at a satisfactory explanation of the development of tumours.

"The intolerance of the body for the disarrangement of its tissues is quite as wonderful as the growth of tumours and its study as illuminating." . . . "We must determine the causes of the growth of cells in general and the factors which underlie the increase in the energy of their growth as well as those which limit and hold it in check and render it practically impossible for normal tissue to continue its growth when displaced from its normal relations, or when in excess of the amount necessary for the body's needs. One side of this problem seems quite as important as the other; for in the development of an invasive tumour, we have the subversion of the ordinary laws which we assume to govern the proportions and proper relations of tissue growth."

These sentences embody points of view to which many will readily subscribe. It is unfortunate that the worker on the reactions leading to resistance to the growth of cancer and also of normal tissue (as the immunity reactions may be more correctly described), and who contributes no fewer than fourteen articles out of twenty-seven in vol. ii., had not diverted some of this industry to acquiring an accurate knowledge of the work of others so as to present their views correctly and himself avoid possible pitfalls in experimentation. His presentations of Ehrlich's atreptic or starvation theory of immunity have already called forth a vigorous protest on the part of the latter, but the misstatements are not corrected even by so much as a foot-note in the reprint in the present volume. Equally distorted statements are made by writing:—

"Bashford in his conceptions of immunity in cancers of mice and rats, denies that there is any direct influence of the host upon the inoculated cancer cell," and, to take only one other example, by asserting, "Bashford, Russell, and Da Fano, in describing the connective tissue and vascular scaffolding of the cancer cells, mean primarily the layer of fibrous tissue which surrounds and encapsulates the graft." On the contrary, the mere conception of a scaffolding for the cancer cells is intended to exclude this idea. What is meant is the penetration of the connective tissue and vascular cells between the cancer cells in such a way that the original arrangement is accurately reproduced in normal animals, but not in immunised animals. It would not have been worth raising the point now had it not been that the power of the cancer cells to elicit a specific form of stroma in the normal animal, and the paralysis of their power to do so in immune animals, are as yet the only trustworthy manifestations of the regulation of growth on which MacCallum rightly lays so much stress.

The tentative character of several of the papers is necessarily the result of the system of giving grants to workers for a particular line of research for a determinate period, and can only be avoided by adopting a system enabling men with wide knowledge and training to become intimately acquainted over a long period with such highly specialised work as cancer research has now become. Thus, MacCallum writes on the basis of the work criticised above on resistance to growth, that in an immune animal the portion of tumour implanted is surrounded by connective tissue as though it were a mere foreign body; and in spite of this abundant *stroma reaction,* or perhaps on account of it, the tumour fails to grow. The important facts are not only the surrounding of a graft in these circumstances by a connective tissue which *differs* from that in normal animals, but also the failure of the reacting tissues to penetrate into the graft so as to supply it with a new characteristic stroma or scaffolding. Similarly, the occasional finding that resistance has been produced after the inoculation of tissue from a strange species, or by autolysed tissues, or that it is possible to convey passive immunity, cannot be employed against the enormous preponderance of observations to the contrary.

It would be ungenerous not to admit that mistakes are unavoidable at the outset of inquiry planned as were these preliminary investigations of the Crocker Fund, and MacCallum himself generously acknowledges the progress being made by experiment in a brief summary. "When it became apparent that tumours of animals could be transplanted, and thus used in experimental studies, great hopes were roused, and, indeed, in the past years great things have been accomplished. When we sift the facts impartially, however, we find that we have still some of the greatest problems before us." Of the individual papers, reference may be made to those on the cultivation of tissues, in which due credit is given to Ross Harrison for initiating the method.

Gies, in introducing the bio-chemical investigations, says he believes that "the essential factor in the etiology of cancer is a stimulus to cell division of intra-cellular origin, and that complete understanding of the disease awaits more definite determination of the constitution of protoplasm, and the reaction tendencies and functional alignments of the substance peculiar to cells."

"Injury causes different kinds of disease because different discoordinations of intra-cellular constituents result therefrom. . . . Tumours may result from intra-cellular derangements, from discoordinations of functionally related cellular constituents. . . . More closely defined a disturbance in the production of all the anti-bodies directed against the cells or proteins of other individuals of the same species might be of prime importance as an etiological factor in cancer Isocells." Unfortunately, Gies's programme could not be carried through owing to the difficulties placed in his way. "Without tumourous animals, without cancer patients, and without carcinomatous supplies, all our plans for direct chemical attack on the cancer problem had to be suspended." All three volumes are well indexed.

Reverting to vol. i, it is correctly described in the sub-title as a review of "The Study of Experimental Cancer," and is a compilation by Dr. W. H. Woglom of all that has been done on experimental cancer. Incomplete reviews are available in Germany by Karl Lewin and in France by Contamin, but there existed up to the appearance of the present volume no complete or, indeed, extensive review of the more recent experimental investigation of cancer. Dr. Woglom has now supplied this want in a most admirable and complete manner. The literature of experimental cancer has grown at a great rate, and is already so enormous that only those who have been in the midst of this work from the beginning can take a comprehensive survey of the subject. To them, however, the book must prove an indispensable book of reference, but it will be even more welcome to others who wish to take up the threads of research now or later. A critical *précis* is not attempted, because so much of the work is too new to permit of fair criticism and evaluation. The results which are likely to prove permanent are set forth in a final chapter.

The volume is written in a remarkably clear style. Contradictory results and deductions are set forth with the utmost effort at impartiality, so that the reader can readily find points of attack for fresh work should that be his object. The indices, both of subjects and of authors, are very full, and the literature given is probably as complete as it can be. It is within the knowledge of the reviewer that Dr. Woglom made especial effort to consult personally all the originals and verify each reference. It is but natural, since Dr. Woglom was for some years a highly-valued assistant of the Imperial Cancer Research Fund, that this fact, and the close association with his colleagues, have led to full recognition of the work of the Imperial Cancer Research Fund; but it was Dr. Woglom's aim that no injustice should thereby be done to any other worker or centre of cancer research.

Vol. i., unlike vols. ii., iii., and iv., has been issued not only as a large quarto, but fortunately in octavo form at the same price. This is really a boon, because by simply cutting off the large margins Dr. Woglom's book has been reduced by more than two pounds dead weight, viz., from more than four to less than two pounds.

It is noteworthy that throughout the three large volumes reviewed, the question of the etiology of cancer is nowhere seriously raised from the viewpoint of a possible "cancer parasite." Cancer is regarded as a problem of growth, and the question of a *stimulus* to growth (a growth hormone in Starling's sense), is frequently and often ably discussed. But in the light of experiment it appears to the reviewer that the question should also be considered from the point of view of the absence or withdrawal of resistance to growth, of "chalones" in Schäfer's sense, if it be justifiable so to extend the term. E. F. B.

A NEW TACTICAL TREATISE.

The Principles of War. By Major-General E. A. Altham. With an Introduction by General Sir H. L. Smith-Dorrien. Vol. i. Pp. xv+436+maps. (London: Macmillan and Co., Ltd., 1914.) Price 10*s.* net.

GENERAL ALTHAM has produced the first of a series of volumes on major tactics, under the title of "The Principles of War." Although the fundamental principles of war are neither very numerous nor in themselves very abstruse, their application is difficult. War is not an exact science, and cannot be reduced to a series of mathematical formulæ. All that can be done is to deduce from actual experience certain broad principles, and leave it to study and to practice to create an instinct in the mind of the soldier for their correct application to the circumstances of the moment.

But tactics are constantly affected by the progress of science, and disaster may ensue if its effect is not correctly appreciated. In peace there is no means of putting modern appliances to the ultimate test of battle, and imagination must necessarily play so large a part in peace preparation for war, that there is always a danger of fundamental principles being obscured by an exaggeration of the effect of new inventions. Thus General Altham ascribes the French defeats in 1870 to the false theory they had formed that the improvement in the rifle favoured defensive tactics, a theory which ignored the national characteristics of the Frenchman, and committed the French armies to a fatal cult of positions.

General Altham's object in this volume is to illustrate from history the doctrine which the General Staff has laid down for the guidance of the Army, and thus constantly to remind students of the necessity for assigning due importance to the lessons of the past in these days of rapid and far-reaching changes in war material.

Field Service Regulations and the training manuals, which contain this doctrine of the General Staff, while entirely complete in themselves, are necessarily somewhat condensed in form. Field Service Regulations, Part 1, in particular—a 220-page summary of the art of war—every word of which has been carefully weighed, and no single sentence of which could be removed without material loss, may seem to be strong meat to many, and is apt to cause a species of mental indigestion if taken in too large doses. The senior officers of the army will remember, possibly with gratitude, that they were more gently nurtured on the pages of Home and Clery.

General Altham's work bids fair to take the place of these authors on the bookshelves of the younger generation of soldiers. His method is to take a series of texts from Field Service Regulations, and to preach a sound and simple sermon on each of them, impressing his lessons on the mind by one or more graphic illustrations drawn from the campaigns of the last half century. *En passant,* we express the hope that he may be able, both in his subsequent volumes, and in the later editions of this one, to draw more extensively for illustration upon the recent operations in the Balkans.